# System for quality control of detector liquids during production

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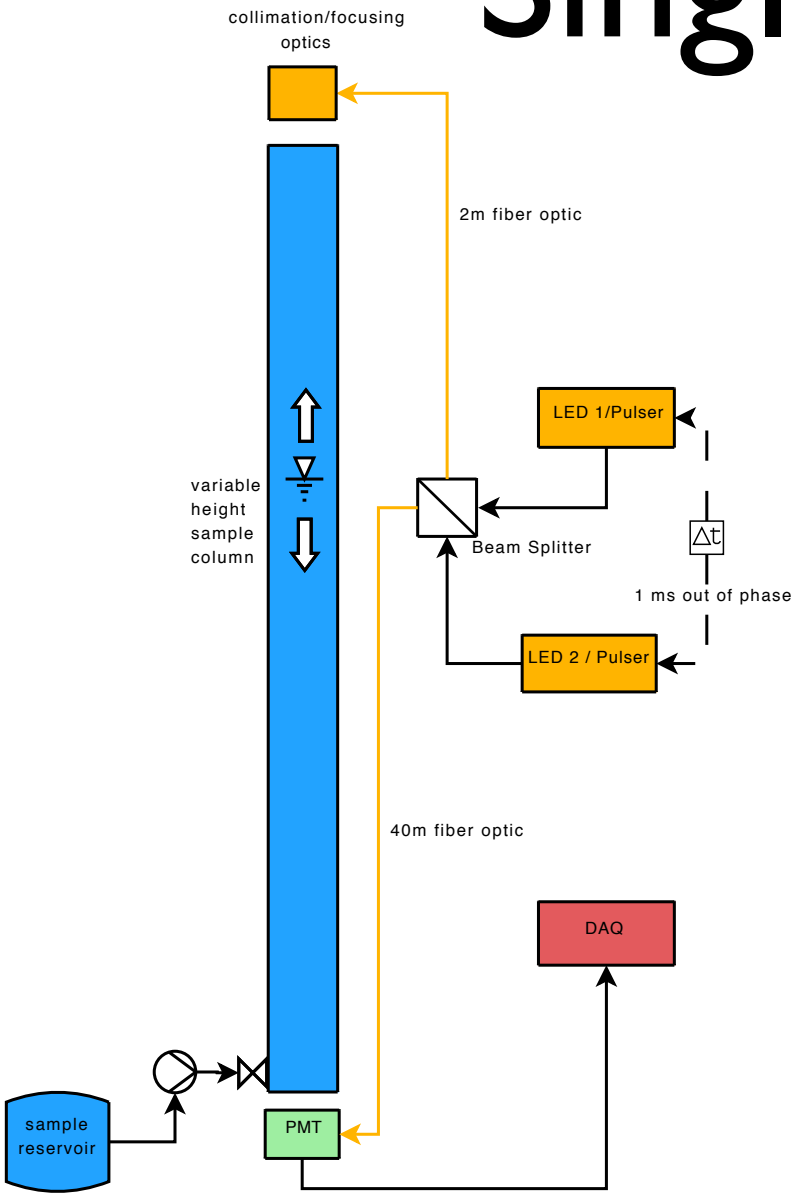
# Purpose

- Large production facility being planned at Dayabay for various liquids.
- A standardized single system for quality control of optical properties is needed.
- Following proposal is based on the system developed at BNL over last several months.
- BNL system is under use for very precise studies. Johnny Goett has presented results.

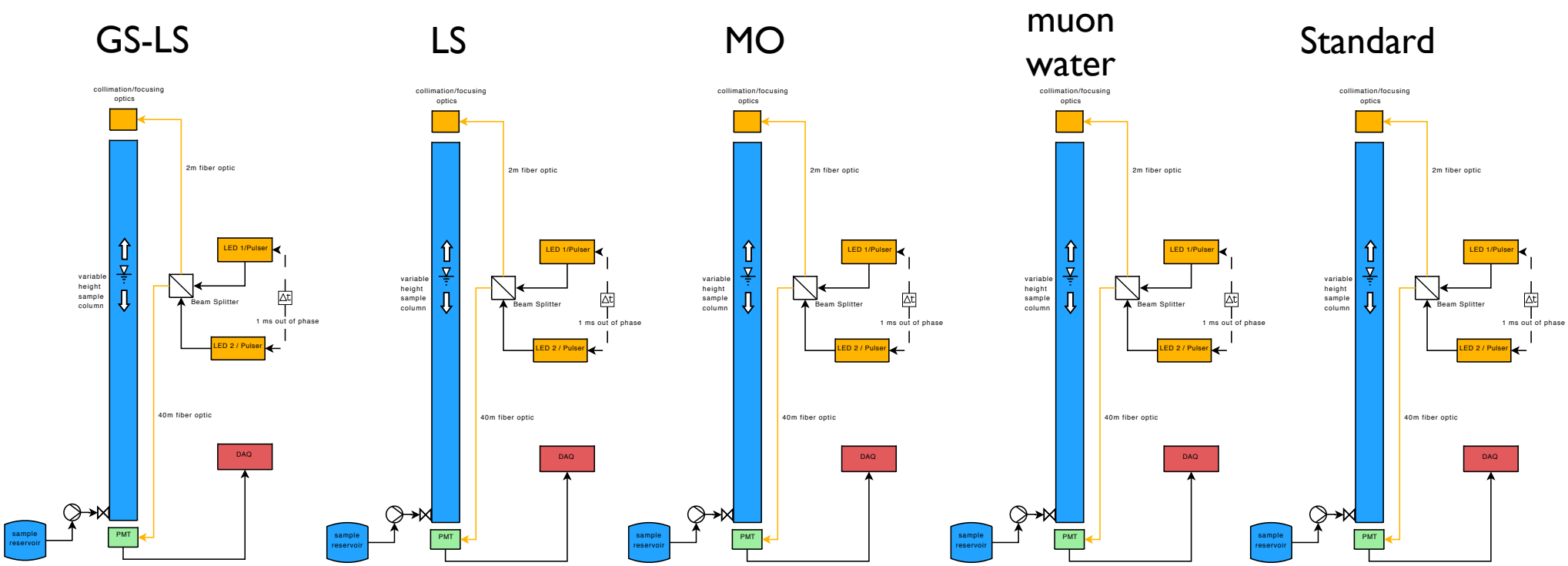
# Single element




## Benefits

- Tube is teflon coated stainless steel. All system components have been certified to be compatible with LAB based LS.
- Optics is based on fibers and LEDs and so it is robust and self calibrating.
- A peristaltic pump (labview controllable) used to obtain samples from production reservoir.
- All components are off-the-self.
- 0.1% stability has been demonstrated.
- A cover gas (for inert atmosphere) can be used.
- Single DAQ can be used for upto 8 tubes.

# The entire system




All 5 served by a single VME DAQ system

5 tubes will prevent cross-contamination.

The standard can be used to make sure of environmental stability.

# Capital Cost

| | Unit cost | Units | production |
|---|---|---|---|
| SS Tube | $800 | 5 | 3 months |
| quartz window | $500 | 5 | 2 months |
| Optics | $1500 | 5 | 1 week |
| Cables+SMA connectors | $100 | 5 | 1 week |
| HV | $1500 | 3 | 1 month |
| VME crate | $6000 | 1 | 1 month |
| VME controller | $5000 | 1 | 2 months |
| Flash ADC | $10000 | 1 | 2 months |
| PMT | $1500 | 5 | available |
| Mechanical components | $5000 | 1 | In house machinist |
| Total | | $55,500 | |

We already have PMTs, and the data acquisition system. If needed to save money we can move the BNL system to save ~$21000

# Personnel

- 1 onsite technician for installation 6 months.
- 1 chemistry postdoc
- 1 physics postdoc
- No engineering needed.
- Postdocs needed for both installation and data acquisition.

# Space

- 4 meter by 4 meter room is needed with at least 10 ft ceiling. 14 foot ceiling would be very helpful.
- Room needs clean water, storage cabinet for chemicals and, of course clean power.
- Needs to be close to the LS production facility so that samples can be brought in frequently.
- During measurement, which could be for a few hours every night, the room must be isolated from pump vibrations, air conditioning equipment vibrations, and vehicle noise.
- If a section of the room is light-tight, it will make installation easier, but it is not critical.

# Summary

- Will require 3-4 months of effort on software.
- Can be assembled quickly.
- Almost all parts are off-the-shelf.
- Will require a technician and postdocs to install.
- No engineering needed.